

# VALLEY WEATHER WIND



**Fall/Winter 2009**

**A Newsletter for Emergency Managers, Core Storm Spotters, Media, and Public Officials in Eastern Nebraska and Southwest Iowa**

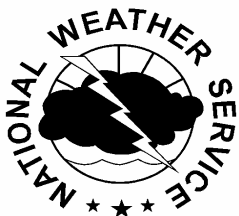
Comments and suggestions are always welcome.  
Your feedback is very important to us!

Please contact us by telephone, e-mail, or regular mail.

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This publication also is available on-line at  
<http://www.crh.noaa.gov/oax/news/newsletter.pdf>

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## Oh, What a Week! Late December Back in '83

*by Rick Chermok, Meteorologist*

December 1983, especially the week leading into Christmas day, was a time that many of us who are old enough to remember try to forget. Numerous record cold temperatures were set in eastern Nebraska, including a stretch of 205 hours in Omaha when the temperature failed to climb above zero. That's right... at 2 am CST on December 17<sup>th</sup>, the mercury fell to zero, and it didn't climb above zero until 3 pm on December 25<sup>th</sup>.

The month began on a cold note as a late November ice and snow storm laid down a frozen foundation, allowing for little moderation of the near continual invasion of Arctic air that plunged south across the plains. (As a side note, the Omaha area had at least 1 inch of snow on the ground from late November 1983 through early February 1984, a record 76 days.)

In Omaha, record lows were set on December 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup>, 23<sup>rd</sup>, 24<sup>th</sup> and the 25<sup>th</sup>. On the 22<sup>nd</sup>, the low touched 24 below, and although that was a record at the time, it has since been beaten by 25 below in 1989. However, the 24 below reading is still the second coldest reading on record for the month of December. Record cold maximum temperatures were observed on 5 days from the 17<sup>th</sup> through the 25<sup>th</sup>, the coldest of which was 11 below on the 24<sup>th</sup>. The 11 below zero reading also is tied for the coldest high temperature ever recorded in Omaha in December, matching the record set on December 23<sup>rd</sup>, 1872. December 1983 in Omaha saw 14 days of below zero temperatures, including 11 consecutive days, and 5 out of the top 10 coldest temperatures ever observed in December in Omaha were recorded in 1983.

Similar sub-zero readings and records were observed at the National Weather Service offices in Lincoln and Norfolk (which were still in operation at the time). Like Omaha, Lincoln had record-setting cold. The low temperature of 27 below on the 22<sup>nd</sup> set the record for the coldest reading in December. Norfolk's coldest reading in that stretch was 22 below on the 22<sup>nd</sup>, setting daily records at

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The annual American Meteorological Society Omaha/Offutt Chapter Picnic was held on September 18th at the NWS Omaha/Valley office. Around 70 people attended the BBQ and balloon launch.

## Oh, What a Week!, cont'd

the time but surpassed in 1989. Also, like in Omaha, when the temperatures fell below zero on December 17<sup>th</sup> in both Lincoln and Norfolk, they didn't rise above zero again until December 25<sup>th</sup>.

Average temperatures for Omaha, Lincoln, and Norfolk for the entire month of December are easily the coldest on record. Norfolk was the coldest, with an average temperature of 6.9 degrees, followed closely by Omaha with 7.8 and Lincoln at 8.1. In fact, the monthly average temperatures are some 6 to 8 degrees colder than the 2<sup>nd</sup> coldest December (which, by the way, in Omaha was December 2000, at 15.5 degrees). The 7.8 degrees in Omaha was not only the coldest December on record, but also was 2<sup>nd</sup> to February of 1936 (5.9 degrees) as the coldest month on record.

## Winter Precipitation Types

*by Bryon Miller, Meteorologist*

Unlike during the summer, many different kinds of precipitation can affect eastern Nebraska and southwest Iowa during the winter. Sometimes these occur alone, but several different precipitation types can occur at the same time. Here are some of the most common types of winter precipitation.

**Snow** - this is precipitation that falls as a solid. It can take on numerous forms, ranging from very small ice crystals to snowflakes and snow pellets. The intensity of snow is generally based on visibility. The visibility with light snow is greater than ½ mile. The visibility with moderate snow is greater than ¼ mile but less than or equal to ½ mile. Heavy snow is associated with visibilities of ¼ mile or less. Most people can easily recognize snow, but there are different types.



**Ice Crystals** – this is very light frozen precipitation that occurs generally with clear skies, very cold temperatures and light winds.

**Snow Flurries** - Light snow falling for short durations. Amounts may range from only a trace up to a light dusting.

**Snow Pellets** - Precipitation of white, opaque grains of ice. The grains are round or sometimes conical. Diameters range from about 0.08 to 0.2 inch (2 to 5 mm).



**Sleet or Ice Pellets** –Transparent or translucent pellets of ice, which are round or irregular, rarely conical, and which have a diameter of 0.2 inch (5 mm), or less. There are two main types: (1) Hard grains of ice consisting of frozen raindrops, or largely melted and refrozen snowflakes. (2) Pellets of snow encased in a thin layer of ice which have formed from the freezing, either of droplets intercepted by the pellets, or of water resulting from the partial melting of the pellets. Diameters are usually 0.2 inches (5 mm) or less.

Sleet on the ground. Photo courtesy of Encyclopedia Britannica.

**Freezing Rain** - Precipitation that falls in the form of supercooled liquid drops. These drops freeze upon impact with the ground, roads, sidewalks and other exposed surfaces. The surfaces become "glazed" with ice. The results may be downed trees, tree limbs and/or power lines, resulting in power outages.

**Freezing Drizzle** – Similar to freezing rain, but it has a smaller drop diameter and is lighter in intensity. Like freezing rain, it causes "glaze" but the ice usually does not get quite as thick, unless it occurs for many hours. It can still accumulate enough to be hazardous.

Sometimes people confuse freezing rain and sleet. Remember, freezing rain falls as liquid rain and then freezes on impact. Sleet is already frozen before it hits the ground.



Freezing rain has glazed the branches of this tree. Photo copyright Josh Boustead.

# Winter Weather Safety

by Bryon Miller, Meteorologist

## Before the storm...

At home and work, plan ahead by having these items on hand:

- ◆ Flashlight and extra batteries
- ◆ Battery-powered NOAA Weather Radio
- ◆ Extra food and water - high energy foods that do not require cooking or refrigeration, such as dried fruit, nuts and granola bars, or canned foods.
- ◆ Can opener
- ◆ Extra medicine
- ◆ First aid kit
- ◆ Emergency heat source and fuel
- ◆ Fire extinguisher
- ◆ Smoke alarm

Also think about livestock and pets...

- ◆ Move animals to sheltered areas - shelter belts, properly laid out and oriented, are better protection for cattle than confining shelters such as sheds
- ◆ Haul extra feed to nearby feeding areas
- ◆ Have water available - most animals die from dehydration in winter storms
- ◆ Make sure pets have plenty of food, water, and shelter



## During the storm...

Stay inside and avoid travel if possible. If travel cannot be avoided, let someone know your travel plans and take a winter safety kit with you. A good automobile winter safety kit includes:

- ◆ Cell phone and charger
- ◆ Blankets
- ◆ Flashlight and extra batteries
- ◆ First aid kit
- ◆ High-calorie non-perishable food
- ◆ Extra clothing to keep dry
- ◆ Knife
- ◆ Tissues and paper towels
- ◆ Small can and waterproof matches to melt snow for drinking water
- ◆ Sack of sand or cat litter for traction
- ◆ Shovel
- ◆ Windshield scraper and brush
- ◆ Tool kit
- ◆ Tow rope
- ◆ Battery booster cables
- ◆ Water container
- ◆ Compass and road maps
- ◆ Cash and a credit card



## After the storm...

Use common sense. Most fatalities are indirectly related to the storm. People die from traffic accidents on icy roads, heart attacks while shoveling snow, and hypothermia from prolonged exposure to cold. Give road crews time to clear the snow and make roads safe. Do not overexert yourself while trying to clear the snow and ice from your sidewalks and driveway. Dress appropriately.



## Winter Weather Watches, Warnings, and Advisories: What Do They Mean?

by Bryon Miller, Meteorologist

The National Weather Service uses specific winter weather terms to ensure that people know what to expect in the coming hours and days. A three tiered concept is used to increase public awareness of incoming winter weather and promote a proper response to the impending hazardous winter weather event. Generically, the three tiers on this concept are Outlook, Watch, and either Warning or Advisory.

1. Outlook – An outlook is used to indicate that a hazardous winter weather event may develop. It is intended to provide information to those who need considerable lead time to prepare for the event.

The **Hazardous Weather Outlook** (HWO) is used to indicate that a hazardous winter weather event may develop in the next 7 days.

2. Watch – A watch is used when the risk of a hazardous winter weather event has increased, but its occurrence, location, and/or timing is still uncertain. It is intended to provide enough advance notice that those who need to set their preparation plans in motion can do so.

A **Winter Storm Watch** is issued to provide 12 to 48 hours notice of the possibility of severe winter weather.

3. Warning or Advisory – These products are issued when a hazardous winter weather event is occurring, is imminent, or has a very high chance of occurring. A warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant inconvenience and, if caution is not exercised, could lead to situations that may threaten life and/or property.



Road in rural Lancaster County blocked by snow after the March 1, 2007, blizzard.  
Photo courtesy of Ken Dewey (University of Nebraska-Lincoln).

A **Blizzard Warning** means that conditions are favorable for a blizzard event to meet or exceed Blizzard Warning criteria in the next 12 to 48 hours. Technically, blizzard conditions include sustained winds or frequent gusts greater than or equal to 35 mph accompanied by falling and/or blowing snow, frequently reducing visibility to less than 1/4 mile for three hours or more.

A **Winter Storm Warning** means that conditions are favorable for 6 or more inches of snow in a 12 hour period, 8 or more inches of snow in a 24 hour period, or 1/4 inch or more of ice accumulation.

A **Winter Weather Advisory** is issued for less serious conditions than a warning that will still have an impact. It means that accumulations of snow (3 to 5 inches of snow in 12 hours), blowing snow, freezing rain or freezing drizzle (less than 1/4 inch), and/or sleet are expected to cause significant inconveniences and, if caution is not exercised, could lead to life-threatening situations.

Be sure to listen carefully to the radio, television, and NOAA Weather Radio for the latest winter storm watch, warning, and advisory information. This information is also available at <http://www.crh.noaa.gov/oax/>.

## Other Warnings and Advisories issued by the National Weather Service

by Rick Chermok, Meteorologist

Besides issuing winter weather precipitation-type advisories and warnings, the National Weather Service also issues non-precipitation based advisories and warnings. Most of these are under the NPW heading, though Wind Chill Warnings and Advisories are under WSW. The criteria of when they are issued are somewhat subjective based on forecaster judgment of the hazard, but certain general guidelines have been developed and are included below. These products are generally issued when forecaster confidence is fairly high that the particular hazard will develop within the next 36 hours.

### Non-Precipitation Warnings

**Hard Freeze Warning** – One new product that will be issued by National Weather Service offices this year is a Hard Freeze Warning. This product will be issued when temperatures of 28 degrees or colder are forecast during the growing season. The growing season is generally defined to start in late April or early May in northeast Nebraska and west central Iowa and around the 3<sup>rd</sup> week of April in southeast Nebraska and far southwest Iowa. The growing season ends around late September or early October in northeast Nebraska and around the end of the first week of October in southeast Nebraska and southwest Iowa.

**Freeze Warning** – Temperatures are forecast to drop to 29-32 degrees during the growing season (or the first freeze of the fall season if it occurs after the end of the normal growing season). Freeze warnings won't typically be issued in the fall after a hard freeze has been observed, even if it is before the end of the normal growing season.

**High Wind Warning** – Sustained wind speeds of 40 mph or greater are expected to last for 1 hour or longer, or wind gusts of 58 mph or greater for any duration.

**Wind Chill Warning** – Wind chill values are forecast to drop to 30 below zero or colder for 1 hour or longer.

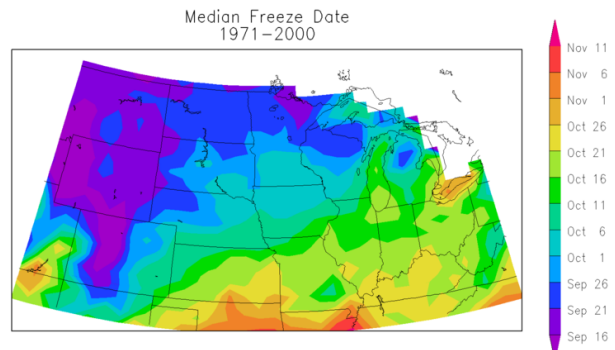
### Non-Precipitation Advisories

**Frost Advisory** – Temperatures are forecast to fall to 33-36 degrees with light winds and mainly clear skies during the growing season. (Frost Advisories are generally not issued in the fall after a freeze has occurred, even if it is before the end of the normal growing season.)

**Dense Fog Advisory** – Widespread dense fog which reduces visibilities to a quarter mile or less.

**Wind Advisory** – Sustained wind speeds of 30-39 mph are expected to last for 1 hour or longer, or gusts of 45 to 57 mph for any duration.

**Wind Chill Advisory** – Wind chill values expected to reach 20-29 below zero for 1 hour or longer.



Median first freeze date across the region. Image courtesy of the Midwest Regional Climate Center.



## NWS Windchill Chart



		Temperature (°F)																		
		Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63	
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times

30 minutes

10 minutes

5 minutes

Wind Chill (°F) =  $35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

## Cold Summer and Early Fall in the Heartland

by Barbara Mayes, Meteorologist

Have you heard it's been cold lately?

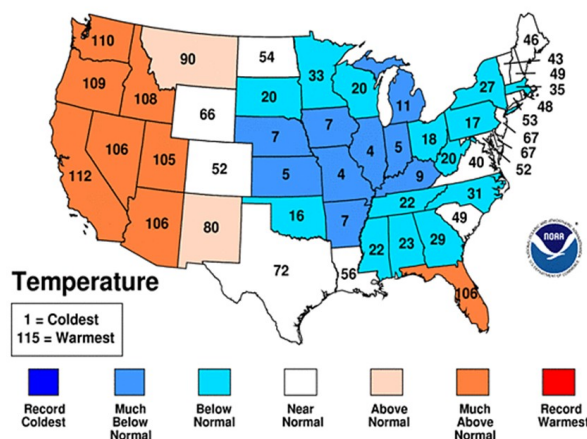
It wasn't your imagination. Temperatures in the area have averaged below normal from June through October, and no matter which way you slice the records, the answer comes up the same: It was a cold summer that has lasted into the early fall!

A few facts about the cold:

- ◆ The summer (June 1 to August 31) was the 10<sup>th</sup> coldest on record in Omaha, the 15<sup>th</sup> coldest on record in Lincoln, and the 5<sup>th</sup> coldest on record in Norfolk.
- ◆ The period from June 1 to October 25 was the coldest on record in 2009 at Omaha, Lincoln, and Norfolk.
- ◆ The months of July and October will rank among the top 6 coldest for each month at Omaha, Lincoln, and Norfolk.
- ◆ There were 12 days at or above 90 degrees in Omaha in 2009, the fewest since 1992 (4) and 1993 (9), and the 9<sup>th</sup> fewest since records began (average is 32 days). There were 22 days at or above 90 degrees in Lincoln in 2009, the fewest since 1992 (15), 1993 (19), and 1996 (20), and the 14<sup>th</sup> fewest since records began (average is 42 days). There were 16 days at or above 90 degrees in Norfolk in 2009, the fewest since 1992 (6), 1996 (10), and 1993 (13), and the 12<sup>th</sup> fewest since records began (average is 35 days).
- ◆ Average temperatures in July were nearly the same as June and August in Omaha, Lincoln, and Norfolk as temperatures in July were suppressed. Normally, the average temperature in July is about 5 degrees warmer than June and about 2 degrees warmer than August. Temperatures through the summer at all three locations resembled June average temperatures.

### July-September 2009 Statewide Ranks

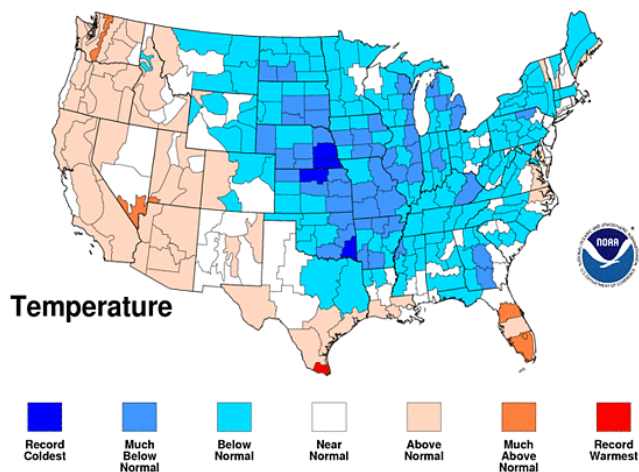
National Climatic Data Center/NESDIS/NOAA



Cold weather was mainly limited to the central U.S., as temperatures around the coasts as well as globally were above average throughout the summer and into the early fall. On the bright side, lower temperatures in the summer usually equate to reduced energy costs for cooling!

### Apr - Sep 2009

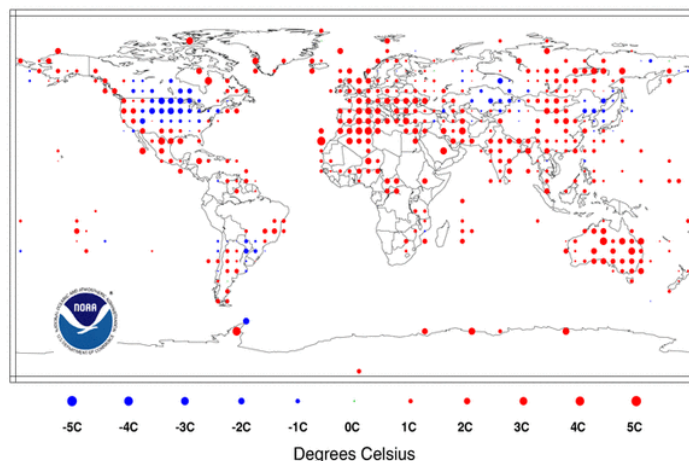
National Climatic Data Center/NESDIS/NOAA



### Temperature Anomalies Jun-Aug 2009

(with respect to a 1961-1990 base period)

National Climatic Data Center/NESDIS/NOAA





## Winter Outlook and the El Niño Influence

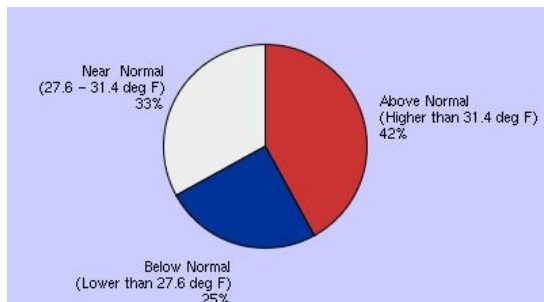
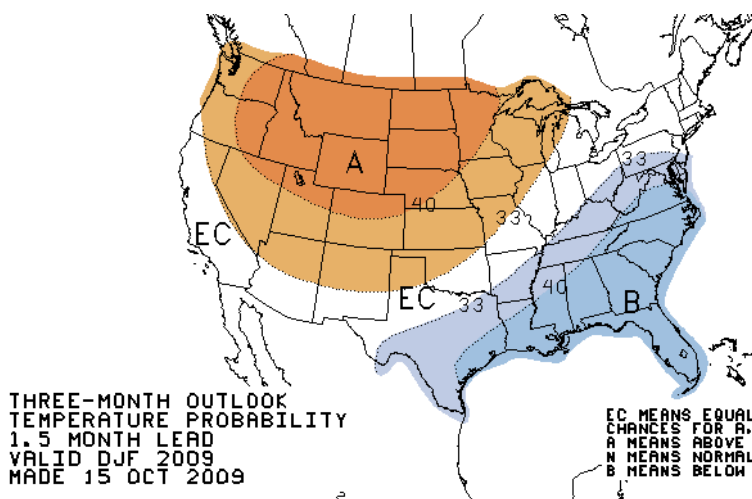
by Barbara Mayes, Meteorologist

For the winter months (December through February), the National Weather Service's Climate Prediction Center is indicating a higher than usual chance of above normal temperatures, and equal chances of above, near, and below normal precipitation.

The "temperatures" that are forecast are an average of the daily highs and lows, which are then averaged over the entire 3-month period. Warmer than normal temperatures can occur if the nighttime lows are above average, the daytime highs are above average, or both.

The precipitation forecast of "equal chances" means that the Climate Prediction Center has no information to support higher chances of wetter or drier conditions than usual. It is even more uncertain to try to predict whether snowfall will be above, near, or below normal, since snow amounts depend so heavily on temperature changes in small areas over short periods of time.

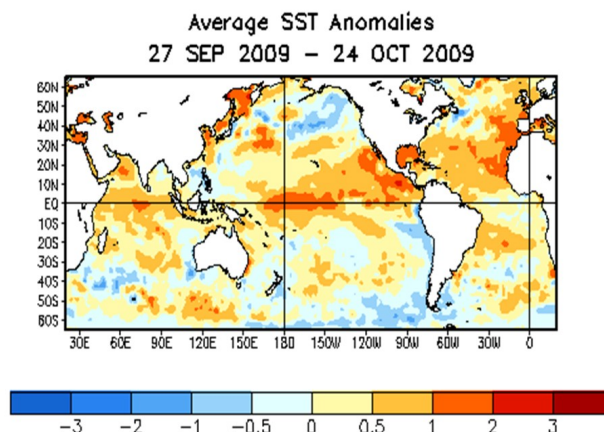
Climate Prediction Center outlooks are available at: <http://www.cpc.ncep.noaa.gov/>



The National Weather Service also produces seasonal temperature forecasts for 10 points within eastern Nebraska and western Iowa. The forecast at one point, Omaha, is included for demonstration (see image to the left). Like the forecast across the region, the Omaha outlook indicates a higher than usual chance of above normal temperatures during the winter months (in this case, January through March). These outlooks are available at:

[http://www.weather.gov/climate/calendar\\_outlook.php?wfo=oax](http://www.weather.gov/climate/calendar_outlook.php?wfo=oax)

Over the summer, Pacific Ocean temperatures near the equator made a quick switch from slightly below normal readings to sea surface temperatures well above normal. The graphic to the right shows sea surface temperature (SST) departures from normal, or anomalies; notice the bright orange warm spot in the Pacific Ocean near the equator. El Niño conditions have been in place for several months now and are forecast to continue through the winter months, most likely peaking as a moderate intensity event. El Niño is known to influence weather patterns across the U.S. during the winter, with impacts more predictable and usually more intense as the strength of the El Niño increases. Some of the impacts include the potential for warmer than normal temperatures across the north central U.S., increased wetness from California across the Southern states and into Florida, and a potential for dry weather near the Ohio Valley. The El Niño event is the main reason that the Climate Prediction Center is forecasting the higher than usual chance of above normal temperatures for eastern Nebraska, western Iowa, and points northward.



## Climatological and Astronomical Data

Compiled by Steve Klemm, Hydro-Meteorological Technician

### Climatological Data for June through September 2009

Location	Month	Average	Departure	Rain / Snow	Departure	Highest	Lowest
Omaha	Jun	71.7°	-0.5°	4.58" / 0.0"	-0.53"	98° (23rd)	48° (9th)
	Jul	71.9°	-4.8°	3.65" / 0.0"	-0.05"	94° (24th)	53° (18th, 19th)
	Aug	71.7°	-2.8°	6.24" / 0.0"	-1.08"	98° (8th)	46° (31st)
	Sep	65.5°	+0.1°	1.72" / 0.0"	-0.173"	83° (8th, 16th)	38° (29th)
Lincoln	Jun	72.3°	-0.3°	6.18" / 0.0"	-0.29"	99° (23rd)	49° (9th)
	Jul	72.7°	-5.1°	1.84" / 0.0"	-0.02"	96° (24th)	49° (17th)
	Aug	72.4°	-3.0°	3.20" / 0.0"	-2.03"	102° (8th)	42° (31st)
	Sep	64.4°	-1.6°	1.25" / 0.0"	-1.38"	85° (8th)	34° (29th)
Norfolk	Jun	68.3°	-1.8°	6.11" / 0.0"	+0.07"	93° (22nd)	42° (3rd)
	Jul	70.3°	-4.5°	1.57" / 0.0"	+0.12"	95° (24th)	48° (31st)
	Aug	70.0°	-2.7°	4.28" / 0.0"	-0.79"	93° (7th)	43° (31st)
	Sep	63.1°	-0.3°	2.33" / 0.0"	-1.13"	82° (8th, 17th, 18th)	33° (29th)

### Normal High/Low Temperatures

### Outlook for November, December, and January

Location	Oct 1	Nov 1	Dec 1	Jan 1	<p>The outlook for November, December, and January calls for a higher than usual chance for above normal temperatures, and equal chances of above, near, and below normal precipitation. For additional details and other outlook information, please visit the Climate Prediction Center website at <a href="http://www.cpc.ncep.noaa.gov/">http://www.cpc.ncep.noaa.gov/</a></p>
Omaha	72/47	56/34	40/22	32/12	
Lincoln	74/47	57/33	41/21	33/12	
Norfolk	71/44	54/31	38/18	31/10	

### Sunrise/Sunset ([http://aa.usno.navy.mil/data/docs/RS\\_OneYear.html](http://aa.usno.navy.mil/data/docs/RS_OneYear.html))

	Omaha		Lincoln		Norfolk		<p>Times are given in CST (Central Standard Time) unless otherwise noted.</p>
Date	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
Oct 1	7:20 am CDT	7:06 pm CDT	7:23 am CDT	7:09 pm CDT	7:26 am CDT	7:12 pm CDT	
Nov 1	6:55 am	5:19 pm	6:57 am	5:23 pm	7:02 am	5:24 pm	
Dec 1	7:30 am	4:55 pm	7:31 am	5:00 pm	7:38 am	4:59 pm	
Jan 1	7:50 am	5:05 pm	7:51 am	5:10 pm	7:58 am	5:09 pm	

### Moon Phases

New Moon	First Quarter	Full Moon	Last Quarter
Oct 17	Oct 25	Nov 2	Nov 9
Nov 16	Nov 24	Dec 2	Dec 8
Dec 16	Dec 24	Dec 31	Jan 7
Jan 15	Jan 23	Jan 30	Feb 5



Daylight Standard Time begins at 2 am on November 1st, 2009

Winter Solstice (Start of Winter): December 21st at 11:47 am CST